Fuzzy Particle Swarm Optimization Matlab Code

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Including numerous hands-on problems and solutions, this comprehensive book is a helpful guide and a valuable source of information about Genetic Algorithm concepts for their several practical ...

Keeping an acceptable voltage profile at the system buses is a challenging and a system-wide task. Voltage-control is rooted in rescheduling of the reactive power flow in the lines of power system. Despite the fact that many voltage-control techniques are available to electric power system operators, these systems around the world have been subjected to voltage instability problems and voltage collapses that cause in many occasions complete system breakdowns. In this Book, a new voltage control methodology is presented, which is originated on the use of multi- objective function based on fuzzy set theory and adaptive particle swarm optimization. This methodology is applied to get a solution to the mathematical model that represents the voltage- control problem of a power system. The purpose is to ensure acceptable voltage profile and to minimize both the voltage deviation and the real power loss. The IEEE 30-Bus system model is used to employ the suggested technique to the mathematical model built for the new voltage-control methodology using Matlab code. The findings will be documented and compared with other voltage-control strategies.

Offering a wide range of programming examples implemented in MATLAB®, Computational Intelligence Paradigms: Theory and Applications Using MATLAB® presents theoretical concepts and a general framework for computational intelligence (CI) approaches, including artificial neural networks, fuzzy systems, evolutionary computation, genetic algorithms and programming, and swarm intelligence. It covers numerous intelligent computing methodologies and algorithms used in CI research. The book first focuses on neural networks, including common artificial neural networks; neural networks based on data classification, data association, and data conceptualization; and real-world applications of neural networks. It then discusses fuzzy sets, fuzzy rules, applications of fuzzy systems, and different types of fused neuro-fuzzy systems, before providing MATLAB illustrations of ANFIS, classification and regression trees, fuzzy c-means clustering algorithms, fuzzy ART map, and Takagi– Sugeno inference systems. The authors also describe the history, advantages, and disadvantages of evolutionary computation and include solved MATLAB programs to illustrate the implementation of evolutionary computation in various problems. After exploring the operators and parameters of genetic algorithms, they cover the steps and MATLAB routines of genetic programming. The final chapter introduces swarm intelligence and its applications, particle swarm optimization, and ant colony optimization. Full of worked examples and end-of-chapter questions, this comprehensive book explains how to use MATLAB to implement CI techniques for the solution of biological problems. It will help readers with their work on evolution dynamics, self-organization, natural and artificial morphogenesis, emergent collective behaviors, swarm intelligence, evolutionary strategies, genetic programming, and the evolution of social behaviors.

Systems designers have learned that many agents co-operating within the system can solve very complex problems with a minimal design effort. In general, multi-agent systems that use swarm intelligence are said to be swarm intelligent systems. Today, these are mostly used as search engines and optimization tools. This volume reviews innovative methodologies of swarm intelligence, outlines the foundations of engineering swarm intelligent systems and applications, and relates experiences using the particle swarm optimisation.

Considered one of the most innovative research directions, computational intelligence (CI) embraces techniques that use global search optimization, machine learning, approximate reasoning, and connectionist systems to develop efficient, robust, and easy-to-use solutions amidst multiple decision variables, complex constraints, and tumultuous environments. CI techniques involve a combination of learning, adaptation, and evolution used for intelligent applications. Computational Intelligence Paradigms for Optimization Problems Using MATLAB® / Simulink® explores the performance of CI in terms of knowledge representation, adaptability, optimality, and processing speed for different real-world optimization problems. Focusing on the practical implementation of CI techniques, this book: Discusses the role of CI paradigms in engineering applications such as unit commitment and economic load dispatch, harmonic reduction, load frequency control and automatic voltage regulation, job shop scheduling, multidepot vehicle routing, and digital image watermarking Explains the impact of CI on power systems, control systems, industrial automation, and image processing through the above-mentioned applications Shows how to apply CI algorithms to constraint-based optimization problems using MATLAB® m-files and Simulink® models Includes experimental analyses and results of test systems Computational Intelligence Paradigms for Optimization Problems Using MATLAB® / Simulink® provides a valuable reference for industry professionals and advanced undergraduate, postgraduate, and research students.

"This book aims to describe recent findings and emerging techniques that use intelligent systems (particularly integrated and hybrid paradigms) in engineering design, and examples of applications. The goal is to take a snapshot of progress relating to research into systems for supporting design and to disseminate the way in which recent developments in integrated, knowledge-intensive, and computational AI techniques can improve and enhance such support. The selected articles provide an integrated, holistic perspective on this complex set of challenges and provide rigorous research results. The focus of this publication is on the integrated intelligent methodologies, frameworks and systems for supporting engineering design activities. The subject pushes the boundaries of the traditional topic of engineering design into new areas. The book is of interest to researchers, graduate students and practicing engineers involved in engineering design and applications using integrated intelligent techniques. In addition, managers and others can use it to obtain an overview of the subject, and gain a view about the applicability of this technology to their business. As AI and intelligent systems technologies are fast evolving, the editors hope that this book can serve as a useful insight to the readers on the state-of-the-art applications and developments of such techniques at the time of compilation."

This book provides a comprehensive overview of recent advances in the industrial applications of soft computing. It covers a wide range of application areas, including optimisation, data analysis and data mining, computer graphics and vision, prediction and diagnosis, design, intelligent control, and traffic and transportation systems. The book is aimed at researchers and professional engineers engaged in developing and applying intelligent systems.

This book presents the proceedings of the Tenth International Conference on Management Science and Engineering Management (ICMSEM2016) held from August 30 to September 02, 2016 at Baku, Azerbaijan and organized by the International Society of Management Science and Engineering Management, Sichuan University (Chengdu, China) and Ministry of Education of Azerbaijan. The aim of conference was to foster international research collaborations in management science and engineering management as well as to provide a forum to present current research findings. The presented papers were selected and reviewed by the Program Committee, made up of respected experts in the area of management science and engineering management from around the globe. The contributions focus on identifying management science problems in engineering, innovatively using management theory and methods to solve engineering problems effectively and establishing novel management theories and methods to address new engineering management issues.

A well-known statement says that the PID controller is the "bread and butter" of the control engineer. This is indeed true, from a scientific standpoint. However, nowadays, in the era of computer science, when the paper and pencil have been replaced by the keyboard and the display of computers, one may equally say that MATLAB is the "bread" in the above statement. MATLAB has become a de facto tool for the modern system engineer. This book is written for both engineering students, as well as for practicing engineers. The wide range of applications in which MATLAB is the working framework, shows that it is a powerful, comprehensive and easy-to-use environment for performing technical computations. The book includes various excellent applications in which MATLAB is employed: from pure algebraic computations to data acquisition in real-life experiments, from control strategies to image processing algorithms, from graphical user interface design for educational purposes to Simulink embedded systems.

This book presents new optimization approaches and methods and their application in real-world and industrial problems, and demonstrates how many of the problems arising in engineering, economics and other domains can be formulated as optimization problems. Constituting a comprehensive collection of extended contributions from the 9th International Workshop on Computational Optimization (WCO) held in Gdansk, Poland, September 11– 14, 2016, the book discusses important applications such as job scheduling, wildfire modeling, parameter settings for controlling different processes, capital budgeting, data mining, finding the location of sensors in a given network, identifying the conformation of molecules, algorithm correctness, decision support system, and computer memory management. Further, it shows how to develop algorithms for these based on new intelligent methods like evolutionary computations, ant colony optimization and constraint programming. The book is a valuable resource for researchers and practitioners alike.

Although the particle swarm optimisation (PSO) algorithm requires relatively few parameters and is computationally simple and easy to implement, it is not a globally convergent algorithm. In Particle Swarm Optimisation: Classical and Quantum Perspectives, the authors introduce their concept of quantum-behaved particles inspired by quantum mechanics